

CLAIMS

What is claimed is:

1. A system for producing a coating, the system comprising:
5 a mixing reservoir;
an ultrasonic disperser for ultrasonically dispersing an additive with
another coating component within the mixing reservoir; and
a heat exchanger in communication with the mixing reservoir to
receive a mixture of the additive and another coating component from the
10 mixing reservoir, to cool the mixture by thermal energy transfer from the
mixture to the heat exchanger, and to return the cooled mixture to the
mixing reservoir.
2. The system of claim 1, wherein the heat exchanger comprises a
15 heat exchange coil at least partially positioned within a fluid to allow the mixture
flowing through the heat exchange coil to transfer thermal energy to the fluid.
3. The system of claim 2, wherein the system includes:
a first conduit for communicating the mixture from the mixing
20 reservoir to the heat exchange coil; and
a second conduit for communicating the mixture from the heat
exchange coil to the mixing reservoir.
4. The system of claim 3, wherein the system includes a pump for
25 pumping the mixture from the mixing reservoir, through the conduits and heat
exchange coil, and back to the mixing reservoir.
5. The system of claim 1, wherein the ultrasonic disperser comprises a
sonotrode positionable within the mixing reservoir and a transducer for applying
30 energy to the sonotrode to generate ultrasonic energy.
6. The system of claim 5, wherein the sonotrode is translatable
relative to the mixing reservoir.

7. The system of claim 1, further comprising a mechanical agitator for mechanically agitating the mixture within the mixing reservoir.

5 8. The system of claim 1, wherein the system is adapted for connection to a source of low pressure to reduce pressure of the system and to maintain the system at the reduced pressure.

9. The system of claim 1, wherein the additive comprises pigment particles.
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10. The system of claim 1, wherein the another coating component comprises a binder.

11. The system of claim 1, wherein the another coating component
15 comprises a solvent.

12. The system of claim 1, wherein the another coating component comprises a resin carrier.

20 13. The system of claim 1, wherein the system is adapted to maintain the mixture within a desired temperature range.

25 14. The system of claim 1, wherein the transferred thermal energy includes a substantial entirety of the thermal energy produced from the ultrasonic dispersing.

15. A system for producing a coating, the system comprising:
a mixing reservoir;
an ultrasonic disperser for ultrasonically dispersing an additive with
another coating component within the mixing reservoir;
5 a heat exchange coil;
a first conduit for communicating a mixture of the additive and
another coating component from the mixing reservoir to the heat exchange
coil;
a second conduit for communicating the mixture from the heat
10 exchange coil to the mixing reservoir; and
the heat exchange coil at least partially positioned within a fluid to
allow thermal energy transfer from the mixture flowing through the heat
exchange coil to the fluid.
16. The system of claim 15, further comprising a mechanical agitator for
mechanically agitating the mixture within the mixing reservoir.
17. The system of claim 15, wherein the system includes a pump for
pumping the mixture from the mixing reservoir, through the conduits and heat
20 exchange coil, and back to the mixing reservoir.
18. The system of claim 15, wherein the ultrasonic disperser comprises
a sonotrode positionable within the mixing reservoir and a transducer for applying
energy to the sonotrode to generate ultrasonic energy.
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19. The system of claim 18, wherein the sonotrode is translatable
relative to the mixing reservoir.
20. The system of claim 15, wherein the system is adapted for
30 connection to a source of low pressure to reduce pressure of the system and to
maintain the system at the reduced pressure.

21. The system of claim 15, wherein the additive comprises pigment particles.

22. The system of claim 15, wherein the another coating component
5 comprises a binder.

23. The system of claim 15, wherein the another coating component comprises a solvent.

10 24. The system of claim 15, wherein the another coating component comprises a resin carrier.

25. The system of claim 15, wherein the system is adapted to maintain the mixture within a desired temperature range.
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26. The system of claim 15, wherein the transferred thermal energy includes a substantial entirety of the thermal energy produced from the ultrasonic dispersing.

27. A method of producing a coating, the method comprising:
receiving a coating component within a mixing reservoir;
receiving an additive within the mixing reservoir;
ultrasonically dispersing the additive with the coating component
5 within the mixing reservoir; and
actively cooling a mixture of the additive and coating component by
allowing thermal energy transfer therefrom.
28. The method of claim 27, wherein the actively cooling comprises
10 maintaining the mixture within a desired temperature range.
29. The method of claim 27, wherein the actively cooling comprises
transferring from the mixture a substantial entirety of the thermal energy
produced by the ultrasonic dispersing.
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30. The method of claim 27, further comprising mechanically agitating
the mixture.
31. The method of claim 27, further comprising:
20 reducing pressure within the mixing reservoir; and
maintaining the mixing reservoir at the reduced pressure.
32. The method of claim 31, wherein the reducing and maintaining
comprises placing the mixing reservoir under a vacuum of at least about 29" Hg.
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33. The method of claim 27, further comprising degassing the additive
before receiving the additive within the mixing reservoir.
34. The method of claim 27, wherein the actively cooling comprises:
30 receiving the mixture within a heat exchanger to cool the mixture by
thermal energy transfer from the mixture to the heat exchanger; and
returning the mixture from the heat exchanger to the mixing
reservoir.

35. The method of claim 27, wherein the actively cooling comprises:
receiving the mixture within a heat exchange coil at least partially
positioned within a fluid to cool the mixture by thermal energy transfer from
the mixture to the fluid; and
5 returning the mixture from the heat exchange coil to the mixing
reservoir.
36. The method of claim 27, wherein the ultrasonically dispersing
comprises:
10 positioning a sonotrode within the mixing reservoir; and
applying energy to the sonotrode to generate ultrasonic energy
which propagates through the base within the mixing reservoir.
37. The method of claim 27, wherein the receiving an additive within the
15 mixing reservoir comprises receiving pigment particles within the mixing
reservoir.
38. The method of claim 27, wherein the receiving a coating component
within a mixing reservoir comprises receiving a binder within the mixing reservoir.
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39. The method of claim 27, wherein the receiving a coating component
within a mixing reservoir comprises receiving a solvent within the mixing
reservoir.
- 25 40. The method of claim 27, wherein the receiving a coating component
within a mixing reservoir comprises receiving a resin carrier within the mixing
reservoir.